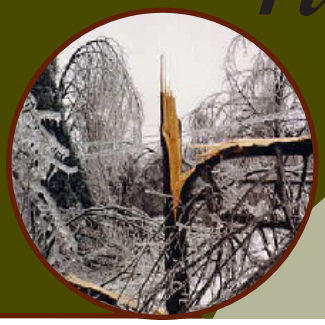
2011 Forest Health highlights

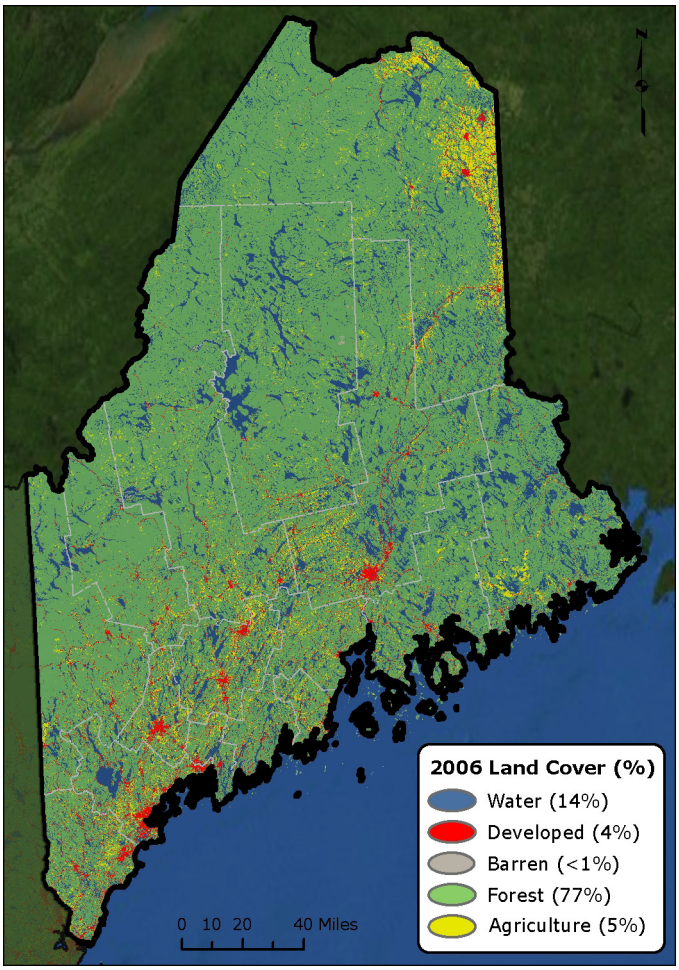
MAINE

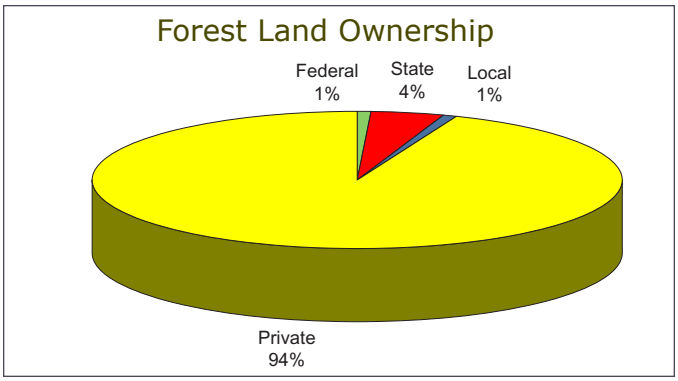


Forest Resource Summary

Almost all of the forest lands in Maine are privately owned—approximately 94 percent—with only 1 percent in Federal ownership that encompasses the eastern portion of the White Mountain National Forest. The latest Maine forest inventory estimates that there are approximately 17.7 million acres in the State that are forested. The forest resource is made up of a variety of forest types, mostly spruce and balsam fir, maples, other hardwoods, and pine.

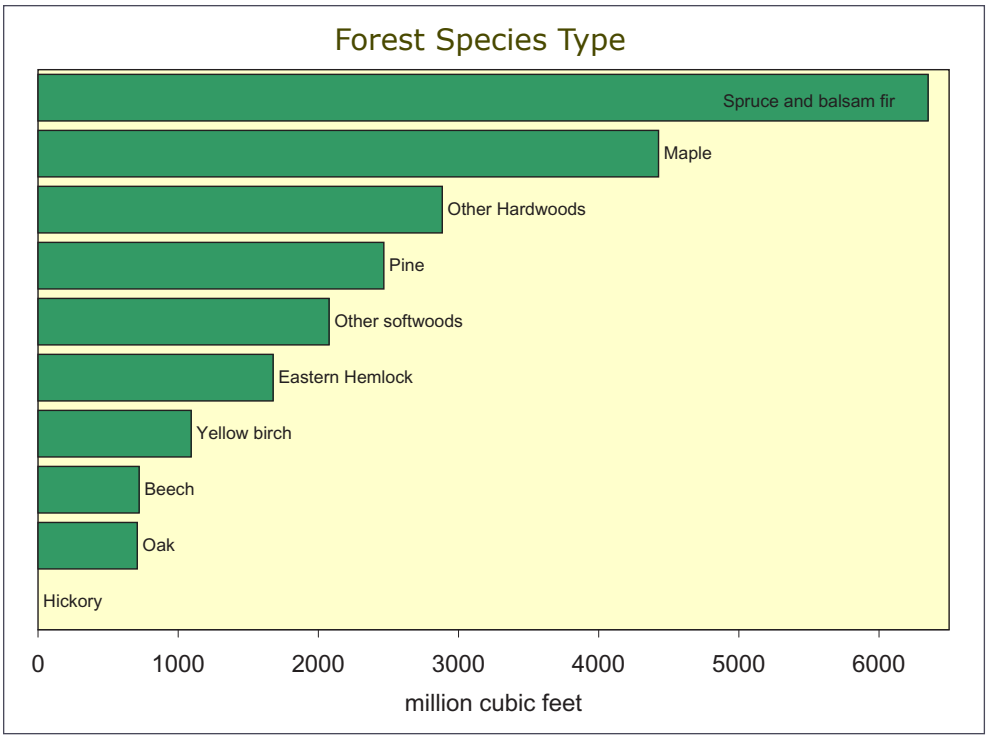
Maine's forests provide much of the raw materials to fuel the State's mills and serve as the backdrop for the recreation industry. These forest-based industries employ more than 12 percent of Maine's workforce and generate more than 11 percent of the State's payroll. The overall annual contribution of the forest resource to Maine's economy exceeds $8.5 billion. The forests of the State also





Forest Health Programs in the Northeast

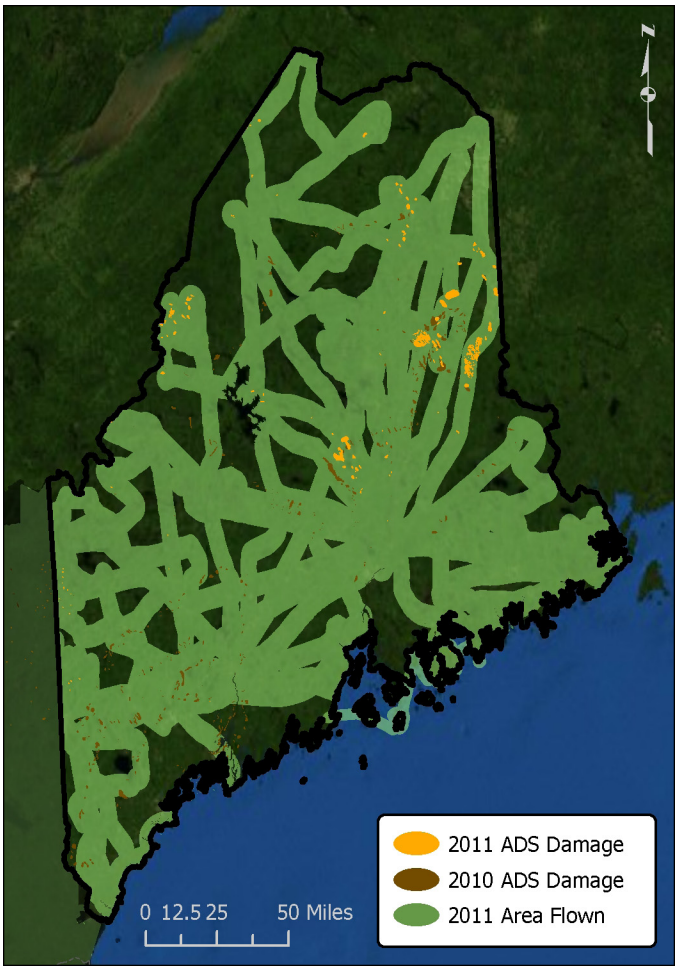
State forestry agencies work in partnership with the U.S. Forest Service to monitor forest conditions and trends in their State and respond to pest outbreaks to protect the forest resource.



provide watershed, environmental, wildlife, and recreational benefits. Forested parks and individual shade trees provide similar amenities in urban and suburban settings.

Aerial Surveys

Maine reported over 60,000 acres of damage. By far, the greatest impact continues to come from a complex of damage agents affecting northern white cedar. Hardwood defoliators also caused observable damage, including the browntail moth, oak leaftier, satin moth, and forest tent caterpillar. Other defoliators affected aspen stands and sugar maple sites.



This map delineates aerial detection survey (ADS) results for Maine in 2011 and 2010.

Insect Damage

The 2011 season began with extremely high **browntail moth** winter web counts in Bowdoinham, Bath, West Bath, Topsham (Sagadahoc County), and Brunswick (Cumberland County) at the southern terminus of Merry Meeting Bay. Feeding began normally in April and early May. The weather then turned cool and wet and the larvae slowed their feeding and spent more time than usual in their webs. The high population, reduced feeding, and cold wet weather probably contributed to the ensuing *Entomophaga aulicae* fungal outbreak that decimated the population (figure 1).

Figure 1.—Browntail moth larvae killed by the fungus Entomophaga aulicae.

The browntail moth populations were reduced to the point where it was difficult to find any larvae at all within the core infested area. Trees that had been partially defoliated rapidly refoliated, and no defoliation was detected in these towns during the aerial survey. The Kennebunkport infestation also disappeared as did the infestations in Lewiston and Turner.

There are still remnants of the Augusta (Kennebec County) population. Browntail numbers are increasing in Falmouth and parts of Freeport (Cumberland County) where 910 acres of moderate to severe defoliation were mapped in the two towns. Reports of an increase in browntail moth came from Peaks Island in Portland Harbor (Cumberland County) as well.

Field trials with the naturally occurring BTM nucleopolyhedrovirus, EcNPV, were carried out in May in Bowdoinham and in September in Freeport (figure 2). The Bowdoinham browntail population was overwhelmed with the *E. aulicae* fungus after the EcNPV application, although the first post-spray sample did show virus present in larval cadavers. The results from the September application have not come in yet. These locations will be monitored for long-term control of the browntail by the virus.

Figure 2.—Applying EcNPV virus to browntail larvae.

Hemlock woolly adelgid was first detected in native hemlocks in Maine in 2003. Until May of 2010, it had not been detected outside of York County, except where it was associated with infested nursery stock. In early May the adelgid was confirmed from a landowner report in Harpswell (Cumberland County). Subsequent survey and landowner reports in 2010 revealed infestations along the southern and midcoast region of the State. In 2011, surveys of high-risk sites in more than 80 towns outside the area known to have infestations of hemlock woolly adelgid produced one new detection of the

insect. Cape Elizabeth (Cumberland County) was added to the list of towns known to have established hemlock woolly adelgid infestations:

- Cumberland County: Brunswick, *Cape Elizabeth*, Cumberland, Falmouth, Freeport, Harpswell, Portland (Great Diamond Island), South Portland, Yarmouth
- Lincoln County: Boothbay, Boothbay Harbor, Bristol, Edgecomb, South Bristol, Westport Island, Wiscasset
- Sagadahoc County: Arrowsic, Bath, Georgetown, Phippsburg, West Bath, Woolwich
- York County: Eliot, Kennebunkport, Kittery, Ogunquit, Saco, South Berwick, Wells, and York

An increase in inquiries from homeowners for advice on adelgid control reflects continued intensification of the problem in the towns of Kittery and York. Residents of this region frequently requested the list of licensed pesticide applicators that will treat for browntail moth and/or hemlock woolly adelgid, organized by region of operation.

Infested planted trees continue to be located. In 2011, an arborist reported an infested hedgerow on a client's property in Mount Desert (Hancock County). Given the details the homeowner provided, the trees may have been part of infested shipments that entered the State in the late 1990s and early 2000s. The hedge was treated with imidacloprid and horticultural oil. Outreach will be focused in that area and the surrounding area will be surveyed for the adelgid.

Efforts to establish biological controls continue in Maine. In 2011, through a grant from USDA APHIS, 10,000 *Sasajiscymnus tsugae* beetles were received from the North Carolina Department of Agriculture rearing lab. An additional 7,000 were purchased from a private supplier with money from a Maine Outdoor Heritage Fund grant and Departmental funds. Releases were conducted at Vaughan Woods (York County) and Wolfe Neck Woods (Cumberland County) State Parks, and on other conserved property in Kittery (York County), Harpswell (Cumberland County), and West Bath (Sagadahoc County) (figure 3).

Figure 3.—Releasing Sasajiscymnus tsugae *predatory beetles.*

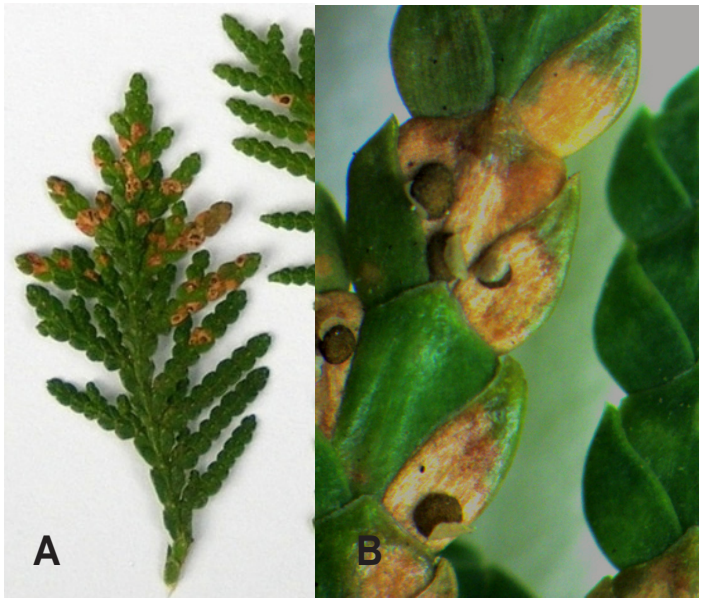
Spruce budworm catches in pheromone traps have increased significantly this year. New Brunswick budworm trap catches are rising as well, and Quebec is experiencing a large budworm outbreak north of the Saint Lawrence Seaway. There are still no reports of larval feeding, and no adults were caught in light traps in Maine. Highest trap catches are in the northwestern part of the State, particularly the far north. Only three

pheromone trap sites Downeast in Washington County continue to have zero moths; all other locations caught some number of budworm moths. The average moth catch from 66 sites across the northern half of the State was 7.3 moths, up from 2.5 moths in 2010, the highest it has been since 1992. The highest moth count was 58.7 moths (average of three traps) in Garfield, Aroostook County. Moth counts were highest in northern Maine. The Maine Forest Service will continue to monitor this serious pest.

Forest Diseases

An unusual disease of northern white-cedar (Arborvitae) was found in Scarborough (Cumberland County) and Kennebunk (York County), Maine. The needle disease, known as **cedar leaf blight**, is well known from western red-cedar (*Thuja plicata*) in the Western United States and Canada. It has also been reported previously on northern white-cedar from a few Eastern States, including Maine, but is considered to be uncommon. Damage in 2011 was reported from mature hedge plantings and was most severe where dense shading and high foliage moisture levels occurred. Symptoms first appear as light brown areas on the individual scale-like leaves. The fruiting bodies (apothecia) of the fungus appear in June on the upper surface of infected needles (figures 4a and b). The apothecia rupture through the needle epidermis, which then often stays attached to the needle. Heavily infected needles and twigs are shed later in the fall.

The primary forest disease survey effort conducted in 2011 involved detecting and evaluating damage resulting from **hemlock tip blight** to eastern hemlock (figure 5). This disease, first recognized and reported on eastern hemlock in 2010, has been found in Androscoggin, Cumberland, Hancock, Kennebec, Knox, Lincoln, Oxford, Sagadahoc, Washington, and York Counties.



Figures 4a and b.—Cedar leaf blight, Didymascella thujina*, on northern white-cedar, Maine.*

Figure 5.—Hemlock tip blight survey crew in Bethel, ME.

In cooperation with U.S. Forest Service employees at Durham, NH, personnel surveyed 11 stands across 9 towns in Maine. U.S. Forest Service and New Hampshire State personnel surveyed additional stands in New Hampshire. The hemlock tip blight pathogen was confirmed at all locations, with varying levels of severity. A preliminary analysis of stand conditions indicated that higher levels of infection occurred where hemlock regeneration was well shaded with a dense overstory than

in more open stands. Additional survey and evaluation work is scheduled for 2012.

Several **white pine needle cast** diseases have long been known to occur in Maine. Three principal pathogens that result in needle infection and subsequent premature needle shedding are *Mycosphaerella dearnessii* (brown spot), *Canavirgella banfieldii*, and *Bifusella linearis*. During the past several years, an increased incidence and severity of needle casts has been observed. These diseases have been observed on white pine throughout the State, but have been most severe in western and southern counties.

The recent widespread distribution of needle casts and the intensity of infections appear to be without precedent in Maine and the Northeastern United States. These disease conditions are likely to have been fostered by the above-average precipitation during the spring and summer seasons that Maine has experienced for the past several consecutive years.

Most damage in northern New England has been shown to be caused by the brown spot pathogen. For brown spot, current-season needles become infected and, over the course of a year, become yellow and eventually turn brown. The needles are then shed during the following spring. White pine normally retains needles for at least 2 years before they are shed; therefore, needle infections can result in the loss of up to 50 percent of the normal complement of foliage.

To date, there has been no documented direct tree mortality from these diseases, but some trees do have very thin crowns (figure 6). Pine understory regeneration is also affected and may be more at risk of succumbing than mature overstory trees. Some trees on poor sites and those along shorelines of rivers and lakes may be most susceptible to mortality if significant needle loss occurs in successive years.

Management options are limited, but include maintaining healthy crown development with appropriate thinning protocols. Adequate spacing will also promote more rapid drying of needles, although in very wet years this may be of little help. Affected stands should be thinned either very cautiously or not at all during years of heavy defoliation, or for one or two years following excessive needle loss. Stands should be monitored to estimate crown density recovery before thinning and other stand disturbance operations can be safely resumed.

Figure 6.—White pine with heavy needle loss in the lower one-half of the crown from needlecast disease in Bethel, ME.

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